2.9 Paleontology

A paleontological evaluation of the Shadow Run Ranch was conducted by Thomas A. Demere, Ph.D. of the Department of Paleoservices at the San Diego Natural History Museum on June 29, 2012 (see Appendix K, "Paleontological Resource Assessment, Shadow Run Ranch, Pauma Valley, San Diego County, California"). The assessment includes a review of site records in the area, a site visit, and where appropriate, selected testing of potential resource areas./The study is dated June 29, 2012.

2.9.1 Existing Conditions

As defined in the report, paleontological resources (i.e., fossils) are the remains and/or traces of prehistoric plant and animal life exclusive of humans. Fossil remains such as bones, teeth, shells, leaves, and wood are found in the geologic deposits (rock formations) within which they were originally buried. For the purposes of the report, paleontological resources can be thought of as including not only the actual fossil remains but also the collecting localities and the geologic formations containing those localities.

2.9.1.1 *Types of Deposits*

Younger Quaternary Alluvial Fan Deposits: The younger alluvial fan deposits within the project area are Holocene and/or late Pleistocene in age, and may produce significant fossils. Therefore, they are assigned moderate sensitivity. Lithologically, they are composed of unconsolidated boulders, cobbles, gravel, sand, silt and clay.

Older Quaternary Alluvial Fan Deposits: Older Quaternary alluvial fan deposits within the project area are reported to be younger than 500,000 years in age (Pleistocene), and include fan, debris flow, and talus deposits, with clasts which are highly weathered in a typically reddish-brown matrix. Lithologically, older alluvial fans are composed of unconsolidated boulders, cobbles, gravel, sand, silt and clay. These are also assigned moderate sensitivity for the reason that these may also produce significant fossils.

Active Channel and Wash Deposits: The active channel and wash deposits within the Shadow Run Ranch property have low paleontological sensitivity because they are late Holocene in age and are thus too young to contain fossils.

2.9.1.2 *Area Resources Assessment*

Fossiliferous Deposits: Knowing the geology of a particular area and the fossil productivity of particular formations that occur in that area, it is possible to predict where fossils will or will not be encountered. Only one previously-recorded fossil locality was found during the museum record search conducted for the Shadow Run project. This locality, LACM (CIT) 599, produced a single tooth of a fossil horse

(Equus sp.). Unfortunately, the locality is described only as being 'from Pala', and its exact whereabouts are unknown.

Alluvial Fan Deposits: Ellis and Lee (1919) mapped uplifted alluvial fan deposits (fanglomerates) in the Pala area, referring to them as the 'Pala Conglomerate.' The old fan surface (Agua Tibia Fan) is as much as 150 feet (elevation 1000 feet) higher than the level of the present day San Luis Rey River. Elevations of fanglomerates in the Pala and Pauma valley areas suggest that deposition occurred at a time when stream-base-level was considerably higher than at present. Tectonic activity on the adjacent Elsinore Fault zone has probably been responsible for this impressive uplift. The age of these deposits is presently unknown.

Paleontological Deposits: Jahns (1954) reported the occurrence of scattered vertebrate remains from the late Pleistocene age in the Pala Conglomerate deposits, but gave no indication as to specific remains that were found or where they were curated. Subsequent fieldwork has failed to turn up any new fossil discoveries in these deposits. It is felt that increased attention to these older alluvial deposits and/or new exposures created by excavation projects will turn up additional fossil material. Younger alluvial fan sediments that are at least 10,000 years old have the potential to contain fossils.

Active Channel Wash Deposits: Channel and wash deposits consisting primarily of gravel and sand are actively accumulating within the Frey Creek drainage and other unnamed drainages within the Shadow Run Ranch property. These sediments were derived from the erosion of bedrock on adjacent mountains and the re-working of older alluvial and colluvial deposits. Geologically, these are the youngest sediments on the property, and as such are unlikely to yield fossils.

2.9.1.3 *Site-Specific Resources Assessment*

A field survey was conducted of potentially fossiliferous portions of the project site to field check the results of the literature and record surveys and to determine the paleontological sensitivity of the geologic units that would be affected by the planned improvements. This field work involved inspection of the site for bedrock outcrops and exposures of potentially fossiliferous surficial deposits, geologic contacts, and the presence or absence of paleontological resources (i.e., fossils).

Murphey and Browne's assessment of the project site found three geologic units: younger and older Quaternary alluvial fan deposits that are considered to be moderately sensitive geologic units, and active alluvial flood plain deposits that are considered to have low paleontological sensitivity. From Frey Creek to Adams Drive, the entire Shadow Run Ranch property is underlain by older and younger alluvial fan deposits, which are carved by active channel and wash deposits that crisscross the property. Onsite alluvial fan deposits are generally not exposed due to the nature of

the topography and the coverage provided by the existing groves. Older alluvial fan sediments are well exposed at several locations in the northeast portion of the property. No fossils were observed within the Shadow Run property during the field survey.

Channel and wash deposits are present within Frey Creek. The unnamed drainage that traverses the center of the property has been partially channelized, and is no longer actively accumulating sediments.

2.9.2 Analysis of Project Effects and Determination as to Significance

Direct impacts to paleontological resources occur when earthwork activities, such as mass grading operations, cut into the geological deposits (formations) within which fossils are buried. These direct impacts are in the form of physical destruction of fossil remains. Since fossils are the remains of prehistoric animal and plant life, they are considered to be nonrenewable resources. Such impacts can be significant and, under CEQA guidelines, require mitigation. Analysis of project impacts included the review of relevant published geologic reports, unpublished paleontological reports, and museum paleontological site records.

2.9.2.1 *Guidelines for the Determination of Significance*

Guidelines to determine paleontological significance were taken from the *County of San Diego's Guidelines for Determining Significance Paleontological Resources, modified January 15, 2009.* The guidelines state that an affirmative response to or confirmation of the following guideline will generally be considered a significant impact related to paleontological resources as a result of project implementation, in the absence of scientific evidence to the contrary. The project will have a significant impact if:

1. The project proposes activities directly or indirectly damaging to a unique paleontological resource or site. A significant impact to paleontological resources may occur as a result of the project, if project-related grading or excavation will disturb the substratum or parent material below the major soil horizons in any paleontologically sensitive area of the County, as shown on the San Diego County Paleontological Resources Potential and Sensitivity Map.

Impacts to paleontological resources are rated in this analysis on a Significance of Impacts Scale from high to zero depending upon the resource sensitivity of impacted formations. The specific criteria applied for each sensitivity category as summarized below.

1. High Significance – No high-sensitivity formations for the occurrence of paleontological resources were identified on the project site.

2. Moderate Significance –Formations that are classified as moderate significance for the occurrence of paleontological resources have been identified on the project site. These formations include older and younger alluvial fan deposits that are at least 10,000 years old.
3. Low Significance – Formations that are classified as low significance for the occurrence of paleontological resources have been identified on the project site. These formations include active channel and wash deposits.
4. Zero Significance – No zero sensitivity formations for the occurrence of paleontological resources were identified on the project site.

2.9.2.2 *Analysis*

Guideline 1: The project proposes activities directly or indirectly damaging to a unique paleontological resource or site.

Moderately sensitive geological units within the project site include older and younger alluvial fans deposits. These formations are at least 10,000 years old and so may produce significant fossils. While no fossils were observed within the Shadow Run Ranch property during the field survey, exposure of older alluvial deposits and/or new exposures created by grading and excavation up to approximately 12 feet in depth could turn up additional fossil material. Potential impacts to scientifically significant paleontological resources would be in the form of destruction of potential fossil remains during grading and excavation for residential construction including associated infrastructure and access roads. The guideline is exceeded and impacts are significant (**Impact PA-1**). Mitigation is required.

2.9.3 Cumulative Impact Analysis

The cumulative study area is shown on Figure 1-6, "Cumulative Projects" The area encompasses both sides of the San Luis Rey River in the vicinity of the project and includes geological units of the type found on the site, that is alluvial deposits of varying ages. Research at the County of San Diego has revealed that one project, TM 5499 (Club Estates), was assessed as having a potential impact to paleontological resources. This site is located approximately three miles southwest of Shadow Run on the south side of SR76 and just north of the river. The project had a potential to impact resources during site grading; however, its impacts were mitigated by requiring monitoring during grading. Shadow Run has a similar impact and mitigation that includes monitoring with the authority to divert grading. Mitigation also includes provisions for recovery, documentation, and curating of any fossils found. Therefore, there is no cumulative impact to which the proposed project could contribute.

2.9.4 Significance of Impacts Prior to Mitigation

PA-1 The project could have a direct impact on paleontological resources that might be present in onsite formations of Moderate and Low Sensitivity during grading and excavation operations.

2.9.5 Mitigation

The following mitigation measures must be implemented in order to reduce project impacts to a less than significant level:

APPROVAL OF MAP: The following condition shall be complied with before a Final Map is approved by the Board of Supervisors and filed with the County Recorder of San Diego County (and, where specifically, indicated, shall also be complied with prior to approval of any plans, and issuance of any grading or other permits as specified):

M-PA-1. PALEO GRADING MONITORING: [PDS, PCC] [DPW, LDR] [GP, IP, MA] [PDS, FEE X 2] INTENT: In order to mitigate for potential impacts to paleontological resources on the project site, a monitoring program during grading, trenching or other excavation into undisturbed rock layers beneath the soil horizons and a fossil recovery program, if significant paleontological resources are encountered, shall be implemented pursuant to the County of San Diego Guidelines for Determining Significance for Paleontological Resources. **DESCRIPTION OF REQUIREMENT:** A County approved Paleontologist "Project Paleontologist" shall be contracted to perform paleontological resource monitoring and a fossil recovery program if significant paleontological resources are encountered during all grading, trenching, or other excavation. The following shall be completed:

a. A County approved Paleontologist ("Project Paleontologist") shall perform the monitoring duties pursuant to the most current version of the County of San Diego Guidelines for Determining Significance for Paleontological Resources, and this permit. The contract provided to the county shall include an agreement that the grading/ trenching/excavation monitoring will be completed, and a Memorandum of Understanding (MOU) between the approved Paleontologist and the County of San Diego shall be executed. The contract shall include a cost estimate for the monitoring work and reporting.

b. The cost of the monitoring shall be added to the grading bonds that will be posted with the Department of Public Works, or bond separately with Planning & Development Services.

DOCUMENTATION: The applicant shall provide a copy of the Grading Monitoring Contract, cost estimate, and MOU to the *[PDS, PCC*]. Additionally, the cost amount of the monitoring work shall be added to the grading bond cost estimate. **TIMING:** Prior to the approval of the map for and prior to the approval of any plan and issuance of any permit, the contract shall be provided. **MONITORING:** The *[PDS, PCC]* shall review the contract, MOU and cost estimate or separate bonds for compliance with this

condition. The cost estimate shall be forwarded to *[DPW, LDR]*, for inclusion in the grading bond cost estimate, and grading bonds. The *[DPW, PC]* shall add the cost of the monitoring to the grading bond costs, and the grading monitoring requirement shall be made a condition of the issuance of the grading or construction permit.

PRE-CONSTRUCTION MEETING: The following action will occur prior to Preconstruction Conference, and prior to any clearing, grubbing, trenching, grading, or any land disturbances:

M-PA-2. PALEONTOLOGICAL MONITORING: [DPW, PDCI] [PDS, PCC] [PC] [PDS, FEE X2] INTENT: In order to comply with Mitigation Monitoring and Reporting Program pursuant to 3100 5223, a Paleontological Resource Grading Monitoring Program shall be implemented. **DESCRIPTION OF REQUIREMENT:** The County approved Project Paleontologist, and the PDS Permit Compliance Coordinator (PCC), shall attend the pre-construction meeting with the contractors to explain and coordinate the requirements of the grading monitoring program. The Project Paleontologist shall monitor during the original cutting of previously undisturbed deposits for the project, both on and off site, the Qualified Paleontological Resources Monitor shall be on-site to monitor as determined necessary by the Qualified Paleontologist. The grading monitoring program shall comply with the County of San Diego Guidelines for Determining Significance and Report Format and Content Requirements for Paleontological Resources. **DOCUMENTATION**: The applicant shall have the contracted Project Paleontologist attend the preconstruction meeting to explain the monitoring requirements. **TIMING**: Prior to Preconstruction Conference, and prior to any clearing, grubbing, trenching, grading, or any land disturbances this condition shall be completed. **MONITORING**: The [*DPW, PDCI*] shall invite the [*PDS, PCC*] to the preconstruction conference to coordinate the Paleontological Resource Monitoring requirements of this condition. The [*PDS, PCC*] shall attend the preconstruction conference and confirm the attendance of the approved Project Paleontologist.

DURING CONTRUCTION: The following actions shall occur throughout the duration of the grading construction:

M-PA-3. PALEONTOLOGICAL MONITORING: [DPW, PDCI] [PDS, PCC] [PC] [PDS, FEE X2] INTENT: In order to comply with Mitigation Monitoring and Reporting Program pursuant to 3100 5223, and the County of San Diego Guidelines for Determining Significance and Report Format and Content Requirements for Paleontological Resources, a Grading Monitoring Program shall be implemented. **DESCRIPTION OF REQUIREMENT:** The Project Paleontologist shall monitor During the original cutting of previously undisturbed deposits for the project, both on and off site, the Qualified Paleontological Resources Monitor shall be on-site to monitor as determined necessary by the Qualified Paleontologist. The grading monitoring program shall comply with the following requirements during grading:

a. If paleontological resources are encountered during grading/excavation, the following shall be completed:

   1. The Qualified Paleontological Resources Monitor shall have the authority to direct, divert, or halt any grading/excavation activity until such time that the sensitivity of the resource can be determined and the appropriate salvage implemented.

   2. The Qualified Monitor shall immediately contact the Qualified Paleontologist.

   3. The Qualified Paleontologist shall contact the County's Permit Compliance Coordinator immediately.

   4. The Qualified Paleontologist shall determine if the discovered resource is significant. If it is not significant, grading/excavation shall resume."

b. If the paleontological resource is significant or potentially significant, the Qualified Paleontologist or Qualified Paleontological Resources Monitor, under the supervision of the Qualified Paleontologist, shall complete the following tasks in the field:

   1. Salvage unearthed fossil remains, including simple excavation of exposed specimens or, if necessary, plaster-jacketing of large and/or fragile specimens or more elaborate quarry excavations of richly fossiliferous deposits;

   2. Record stratigraphic and geologic data to provide a context for the recovered fossil remains, typically including a detailed description of all paleontological localities within the project site, as well as the lithology of fossil-bearing strata within the measured stratigraphic section, if feasible, and photographic documentation of the geologic setting; and

   3. Transport the collected specimens to a laboratory for processing (cleaning, curation, cataloging, etc.).

DOCUMENTATION: The applicant shall implement the grading monitoring program pursuant to this condition. **TIMING**: The following actions shall occur throughout the duration of the grading construction. **MONITORING:** The [*DPW, PDCI*] shall make sure that the Project Archeologist is on-site performing the Monitoring duties of this condition. The [*DPW, PDCI*] shall contact the [*PDS, PCC*] if the Project Paleontologist or applicant fails to comply with this condition.

ROUGH GRADING: The following actions shall occur prior to rough grading approval and issuance of any building permit:

M-PA-4. PALEONTOLOGICAL MONITORING: [PDS, PCC] [RG, BP] [PDS, FEE]. INTENT: In order to comply with the adopted Mitigation Monitoring and Reporting Program (MMRP) pursuant to 3100 5223, and the County of San Diego Guidelines for Determining Significance and Report Format and Content Requirements for Paleontological Resources, a Grading Monitoring Program shall be implemented. **DESCRIPTION OF REQUIREMENT:** The Project

Paleontologist shall prepare one of the following letters upon completion of the grading activities that require monitoring:

a. If no paleontological resources were discovered, submit a "No Fossils Found" letter from the grading contractor to the [*PDS, PCC*] stating that the monitoring has been completed and that no fossils were discovered, and including the names and signatures from the fossil monitors. The letter shall be in the format of Attachment E of the County of San Diego Guidelines for Determining Significance for Paleontological Resources.

b. If Paleontological resources were encountered during grading, a letter shall be prepared stating that the field grading monitoring activities have been completed, and that resources have been encountered. The letter shall detail the anticipated time schedule for completion of the curation phase of the monitoring.

DOCUMENTATION: The applicant shall submit the letter report to the [*PDS, PCC*] for review and approval. **TIMING:** Upon completion of all grading activities, and prior to Rough Grading final Inspection (Grading Ordinance SEC 87.421.a.2), the letter report shall be completed. **MONITORING:** The [*PDS, PCC*] shall review the final negative letter report or field monitoring memo for compliance with the project MMRP, and inform [DPW, PDCI] that the requirement is completed.

FINAL GRADING RELEASE: The following actions shall occur prior to any occupancy, final grading release, or use of the premises in reliance of this permit:

M-PA-5. PALEONTOLOGICAL MONITORING: [PDS, PCC] [RG, BP] [PDS, FEE]. INTENT: In order to comply with the adopted Mitigation Monitoring and Reporting Program (MMRP) pursuant to 3100 5223, and the County of San Diego Guidelines for Determining Significance and Report Format and Content Requirements for Paleontological Resources, a Grading Monitoring Program shall be implemented. **DESCRIPTION OF REQUIREMENT:** The Project Paleontologist shall prepare a final report that documents the results, analysis, and conclusions of all phases of the Paleontological Monitoring Program if resources were encountered during grading. The report shall include the following:

a. If paleontological resources were discovered, the Following tasks shall be completed by or under the supervision of the Project Paleontologist:

1. Prepare collected fossil remains for curation, to include cleaning the fossils by removing the enclosing rock material, stabilizing fragile specimens using glues and other hardeners, if necessary, and repairing broken specimens;

2. Curate, catalog and identify all fossil remains to the lowest taxon possible, inventory specimens, assigning catalog numbers, and enter the appropriate specimen and locality data into a collection database;

3. Submit a detailed report prepared by the Project Paleontologist in the format provided in Appendix D of the County of San Diego's Guidelines for Determining Significance for Paleontological Resources and identifying which accredited institution has agreed to accept the curated fossils. Submit TWO hard copies of the final Paleontological Resources Mitigation Report

to the Director of PDS for final approval of the mitigation, and submit an electronic copy of the complete report in Microsoft Word on a CD. In addition, submit one copy of the report to the San Diego Natural History Museum and one copy to the institution that received the fossils.

4. Transfer the cataloged fossil remains and copies of relevant field notes, maps, stratigraphic sections, and photographs to an accredited institution (museum or university) in California that maintains paleontological collections for archival storage and/or display, and submit Proof of Transfer of Paleontological Resources, in the form of a letter, from the director of the paleontology department of the accredited institution to the Director of PDS verifying that the curated fossils from the project site have been received by the institution."

b. If no resources were discovered, a brief letter to that effect and stating that the grading monitoring activities have been completed, shall be sent to the Director of Planning and Land Use by the Project Paleontologist.

DOCUMENTATION: The applicant shall submit the letter report to the [*PDS, PCC*] for review and approval. **TIMING:** Prior to the Final Grading Release (Grading Ordinance Sec. 87.421.a.3), the final report shall be completed. **MONITORING:** The [*PDS, PCC*] shall review the final report for compliance with the project MMRP, and inform [DPW, PDCI] that the requirement is completed.

2.9.6 Conclusion

A paleontological survey of the site was carried out by a County of San Diego CEQA Consultant List approved consultant. Geologic formations of moderate and low sensitivity were detected, and it was determined that formations of moderate sensitivity could be disturbed by grading and excavation activities. Mitigation measures were required that provide for grading monitoring, recovery, documentation, and curating of any resources uncovered. These measures will provide effective mitigation because fossils will be documented and preserved for future study. Cumulative impacts were assessed by evaluating projects in surrounding areas with similar geologic characteristics. Cumulative effects were not significant because measures to detect and preserve the scientific value of fossils were implemented in all cases where impacts likely could occur.